II. Amendments to the Claims

1-4. (Cancelled)

5. (Previously Presented) The system according to claim 10, wherein the controller is configured to determine if a oversteer conc ition exists based on a measured yaw rate and a measured lateral acceleration signal.

6. (Original) The system according to claim 5, wherein the controller is configured to determine if an oversteer condition exists based on a desired yaw rate and a desired lateral acceleration.

7. (Cancelled)

8. (Previously Presented) The system according to claim 5, wherein the desired yaw rate is calculated according to the relationship:

$$r_{des} = \frac{VhSpd * Steeringratio * SWA}{L + K * VhSpd^2}$$

where,

r_{des}: desired yaw rate

L: wheelbase of the vehicle

K: understeer coefficient

VhSpd: vehicle speed

SWA: steering wheel angle

Steeringratio: steering ratio

9. (Previously Presented) The system according to claim 5, wherein the desired lateral acceleration is calculated based on the relationship:

$$Lat_{des} = \frac{VhSpd^2 * Steeringratio * SWA}{L + K * VhSpd^2}$$

where,

Lat_{des}: desired lateral acceleration

L: wheelbase of the vehicle

K: understeer coefficient

VhSpd: vehicle speed

SWA: steering wheel angle

Steeringratio: steering ratio

10. (Previously Presented) A system for compensating understeer and oversteer in a vehicle having a steer by wire system, the system comprising:

a driver interface system for receiving steering input;

a sensor system to sense the steering input and generate a steering control signal;

a controller in electrical communication with the sensor system to receive the steering control signal, wherein the controller is configured to determine when an understeer or oversteer condition exists and generate a steering assist signal;

a road wheel steering actuation system configured to receive the steering assist signal and adjust a road wheel angle based on the steering assist signal;

wherein the controller includes a proportional integral algorithm and an input to the proportional integral algorithm is the difference between a steering wheel angle and a predetermined understeer compensation reference value scheduled based on a vehicle speed.

11. (Original) The system according to claim 10, wherein the predetermined understeer compensation reference value is determined according to the relationship:

$$UnStrCmp_{ref} = \frac{RWA_{max}}{1 + k * VhSpd}$$

where,UnStrCmp is the understeer compensation reference value, RWA_{max} is maximal allowable road wheel angle, k is an empirical value from the vehicle and VhSpd is the vehicle speed.

12. (Cancelled)

13. (Previously Presented) The system according to claim 10, wherein the controller is configured to generate a steering assist signal such that a yaw rate error and a lateral acceleration error is minimized.

14. (Cancelled)

15. (Previously Presented) The method according to claim 23, wherein the step of determining when an understeer condition exists s based on a measured yaw rate and a measured lateral acceleration signal.

16. (Original) The method according to claim 15, further comprising determining if an understeer condition exists based on a desired yaw rate and a desired lateral acceleration.

17. (Original) The method according to claim 16, further comprising determining an understeer condition exists when the magnitude of the desired yaw rate is greater than the measured yaw rate by a first threshold value for a first time period and the magnitude of the desired lateral acceleration is greater

than the measured lateral acceleration by a second threshold for a second time period.

18. (Previously Presented) The method according to claim 23, further comprising determining if a oversteer condition exists based on a measured yaw rate and a measured lateral acceleration signal.

19. (Original) The method according to claim 18, further comprising determining if an oversteer condition exists based on a desired yaw rate and a desired lateral acceleration.

20. (Original) The method according to claim 19, further comprising determining an oversteer condition exists if the magnitude of the desired yaw rate is less than the measured yaw rate by a first threshold value for a first time period and the magnitude of the desired lateral acceleration is less than the measured lateral acceleration by a second threshold for a second time period.

21. (Previously Presented) The method according to claim 18, further comprising calculating the desired yaw rate according to the relationship:

$$r_{des} = \frac{VhSpd * Steeringratio * SWA}{L + K * VhSpd^2}$$

where,

r_{des}: desired yaw rate

L: wheelbase of the vehicle

K: understeer coefficient

VhSpd: vehicle speed

SWA: steering wheel angle

Steeringratio: steering ratio

22. (Previously Presented) The method according to claim 18, further comprising calculating the desired lateral acceleration based on the relationship:

$$Lat_{des} = \frac{VhSpd^2 * Steeringratio * SWA}{L + K * VhSpd^2}$$

where,

Lat_{des}: desired lateral acceleration

L: wheelbase of the vehicle

K: understeer coefficient

VhSpd: vehicle speed

SWA: steering wheel angle

Steeringratio: steering ratio

23. (Previously Presented) A method for compensating understeer and oversteer in a vehicle having a steer by wire system, the method comprising:

receiving steering input from a driver interface system;

sensing the steering input with a sensor system;

generating a steering control signal;

receiving the steering control signal into a controller;

determining when an understeer or oversteer condition exists utilizing the controller;

generating a steering assist signal; and

adjusting a road wheel angle based on the steering assist signal further comprising calculating the difference between a steering wheel angle and a predetermined understeer compensation reference value scheduled based on a vehicle speed.

24. (Original) The method according to claim 23, further comprising calculating the predetermined understeer compensation reference value according to the relationship:

$$UnStrCmp_{ref} = \frac{RWA_{max}}{1 + k * VhSpd}$$

where, UnStrCmp is the understeer compensation reference value, RWA_{max} is maximal allowable road wheel angle, k is an empirical value from the vehicle and VhSpd is the vehicle speed.

25. (Previously Presented) The method according to claim 23, further comprising generating a steering assist signal based on a proportional integral algorithm.

26. (Previously Presented) The method according to claim 23, further comprising generating a steering assist signal such that a yaw rate error and a lateral acceleration error is minimized.